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HR's Role in Financing Green Supply Chain Transformations

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BULLETIN OF MANAGEMENT REVIEW

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Abstract

This transition should also be to a green supply chain transformation as far as sustainable development is concerned, especially for developing economies like Pakistan. This study investigates the importance of Human Resources (HR) in funding green supply chain changes specific to Pakistan. The current study used mixed methods, employing quantitative data gathering with the organizational survey and qualitative study of expert interviews to assess HR's strategic influence on green financing decisions. The findings suggest that HR is instrumental in securing funding, establishing an organizational culture that values environmental practices, and the engagement of employees in green initiatives. Other bottlenecks have also been considered, such as regulatory limitations, financial restraints, and skills gaps vis-a-vis sustainable supply chain practices. HR has great potential to align sustainability financially and strategically with business performance, as observed from the research. The findings have valuable implications thus for policymakers, corporate leaders, and HR professionals in the quest to fast-track green supply chain transformation in Pakistan.

Keywords: Green Supply Chain, Sustainability, Green Financing, Human Resources (HR), Pakistan, Supply Chain Transformation, Sustainable Development, Organizational Culture, HR Strategy.

Introduction

Background and Rationale

The last ten years have observed a rise in their importance within global supply chains, prompting a unified push to implement green supply chain management (GSCM) practices. The catalyst for this was a growing need to mitigate emissions, ensure compliance with regulated standards, and quench the insatiable consumer desire for green products. Practicing GSCM consists of well-integrated, environmentally conscious supply chain activities to ensure that waste is reduced and resource use is made as efficient as possible. Some studies stress the role of top management commitment in ensuring the adoption of GSCM practices, taking into consideration that it is a fundamental support for the establishment of an organizational culture oriented toward sustainability (Kannan et al., 2013).

Secondly, companies know how important it is nowadays to assimilate environmental sustainability into their core operations, especially through remapping their supply chains. This requires practices that do not just minimize waste and resource consumption but also minimize carbon emissions. These remaps address environmental concerns and respond to

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

stakeholder demands for corporate accountability and sustainability. Building on this, conducting sustainable supply chain management has been noted to establish several projects towards becoming environmentally observed performers and attaining a competitive advantage within the market (Geyi et al., 2019).

The incorporation of Human Resources (HR) in facilitating organizational change has metamorphosed in contemporary times. HRM has found its leverage in financial sponsorship and actualization of such green supply chain transformations. HR departments thus have been in a pivotal position to develop and enact strategies that directly enhance sustainability, including the propulsion of training programs, performance incentives, and the recruitment of talents with environmental values. While fostering an organizational culture that values sustainability, HR aids in the success associated with GSCM practices. Studies have noted that GHRM practices are positively linked to deploying successful ways of environmental management across different organizational functions to improve organizational sustainability (Pham et al., 2023).

The link between HR and sustainable development can be seen to unfold in the strategic manner HR fosters the creation of a culture of sustainability, attracts an environmentally focused workforce, and integrates organizational objectives with environmental ones. HRM can drive organizations to integrate sustainability into their culture through a series of HR initiatives, which allows management at all levels to involve environmental considerations in decision-making and everyday practice (Saba, Fatima, Farooq, & Zafar, 2021). Empirical support suggests that GHRM practices such as environmental training and performance appraisal are significant factors that turn external environmental pressures into proactive environmental insurance efforts inside organizations (Vázquez-Brust et al., 2022).

Research Problem

The link between human resources (HR) and funding green supply chain transformations has been insufficiently examined, particularly from a qualitative perspective. While relevant literature acknowledges the pivotal role of Human Resources in sustaining this eventual productive growth, a noticeable void exists concerning how HR practices can drive sustainable practice changes into actual financing and operational processes along the supply chain.

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

Limited Exploration of HR's Role in Financing Green Supply Chain Transformations

One recent study has pointed to the strategic role of HR in integrating sustainability into organizational practice. Together with some case study research conducted by Gričnik, Mulej, & Žižek (2023), it highlights that HR professionals have a unique opportunity to drive the sustainability agenda, considering that they directly influence organizational culture and employee behavior and, thus, supply chain practices. The researcher maintains that, therefore, sustainable HR functions such as recruitment, training, and performance management need to integrate sustainability into them in order to nurture a culture of responsibility and ethical conduct across the supply chain (Malik et al., 2021).

Correspondingly, qualitative research examines the role of sustainable financial and HR practices in corporate management, how these practices affect organizational performance, and how the creation of societal value can be improved (Ameer & Othman, 2011). It is very important to integrate sustainability into financial strategies and HR policies, as it helps address some of the challenges like climate change, resource scarcity, and diversity in the workforce, therefore enhancing the stakeholder confidence building and competitiveness. (Mukhuty et al., 2022).

The Need to Understand How HR Can Drive Change in the Financial and Operational Aspects of Implementing Sustainable Practices Across Supply Chains

The critical importance of understanding how human resources (HR) can drive changes in the financial and operational aspects of the implementation of sustainable practices all along the supply chain cannot be overstated (Saba, Fatima, Farooq, & Zafar, 2021; Saba, Tabish, & Khan, 2017). According to the researcher, HR has a strategic role in sustainable and ethical supply chain management and the shaping of organizational strategy and culture. HR professionals can lead the way in transforming organizational culture and practice through the following three areas of focus: leadership development, change management initiatives, and integration of sustainability into corporate values and ethics. This not only supports the development of sustainable supply chains but also ensures that the organization grows successfully over the long term--and thus survives global challenges (Hofstetter et al., 2021).

Further, a recent study by Jena and Ghadge (2021) turns to the digitalization of operations and supply chain management, presenting theoretical and methodological implications for HRM (Hussain, et al., 2022; Hafeez, Iqbal, & Imran, 2021). The study finds that HRM practices are key to improving various dimensions of supply chain performance,

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

including talent management, training and development, leadership, organizational culture, and technology integration. This makes it important to look into HR as a driving factor of change for the financial and operational aspects of sustainable practices within supply chains. Taken together, there seems to be growing recognition of HR's role in encouraging sustainability; nevertheless, qualitative research ought to be advanced in order to further comprehend how HR could influence the transformation of the financial and operational aspects of the application of sustainability practices across the supply chains (Valentinov & Chia, 2022).

Research Objectives

1. To understand the role of HR in fast-tracking financial and facilitative transformations in the area of green supply chains.
2. To figure out how HR works from an operational and financial perspective to instill sustainable practices into supply chains.
3. To identify the impeding and enabling factors for HR in backing green supply chain transformation and financing in the corporate setting.

Research Questions

1. How does HR fit into financing green supply chain transformations?
2. How does HR align with companies' sustainability objectives in added value to supply chain financial goals?
3. What do you think are some important challenges that HR has to face in financing green supply chain initiatives and making it happen?
4. How can HR counter these hurdles or utilize best practice approaches?

Significance of the Study

Contribution to Knowledge of HR Influence on Finances in Green Supply Chains

HR plays a critical role in directing financially related strategies for green supply chains by infusing sustainability concerns into workforce planning and corporate decision-making. Studies show that GHRM increases financial performance by congruently implementing HR practices with environmental goals, thus harnessing cost savings and competitive advantages (O'Donohue & Torugsa, 2015). Organizations assist HR in influencing green financing strategies and channeling investments toward sustainable supply chains through employee incentives, training, and performance-based green initiatives (Bhatti et al., 2012).

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

Practical Implications for Organizations to Improve Financing Strategies for Sustainability

The creation of strategic HRM practices in the organization supports sustainable financing more favorably. Such HRM activities boost sustainability to ensure the trust of long-term investors and reduce compliance costs with the regulatory provisions. Companies embedding sustainability into HR domains such as recruitment, performance appraisal, and reward systems find these areas positively correlated with their financial performance and operational efficiency (Jabbour & De Sousa Jabbour, 2015).

Recommendations for a Sound Policy for HR- Finance- and Sustainability Convergence

To strengthen sustainability financing, the organization should develop integrated policies for aligning HR with financial management strategies. This should include ensuring sustainability criteria are set within financial risk assessments, using HR policies to incentivize green innovation, and creating cross-functional collaboration between the HR and finance teams (Mariappanadar, 2020). Also, policy frameworks should be in place to institutionalize training programs equipping employees with financial literacy implementation in the green investment decision-making space (Das & Singh, 2016).

Literature Review

Theoretical Framework

The sustainability of HRM practices finds its theoretical grounding in some central theoretical frameworks, i.e., the Resource-Based View (RBV), Human Capital Theory, Institutional Theory, and Stakeholder Theory. Within this RBV, the importance of internal resources, especially human capital, is emphasized in obtaining or maintaining a sustainable competitive advantage (Barney, 1991). Human Capital Theory states that investment in the skills and knowledge of the employees improves the organizations' performance via better ongoing sustainability practices (Hamadamin & Atan, 2019). Institutional Theory points out that institutional pressures in the form of regulative and normative expectations affect sustainable HR practices (DiMaggio & Powell, 1983). The Stakeholder Theory imposes the balancing of the interests of all stakeholders in the organization as a way of attaining organizational sustainability in the long run (Valentinov & Chia, 2022). Recent studies have expanded these theories in relation to the discussion of those HRM practices focused on sustainability, particularly in the context of SMEs, and the unique external challenges these enterprises face when trying to integrate sustainability considerations into their HR strategies

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

(Purgał-Popieła, 2024).

Linking HR Practices with Organizational Sustainability Outcomes

HR practices play a vital role in determining the sustainability outcome by aligning the workforce strategies with the overall organizational aims. Green HRM is, for instance, working for the achievement of environmental sustainability through the support of students towards pro-environmental behavior as well as for optimal use of resources (ul Haq, 2019; Renwick et al., 2012). A sustainable HRM framework further emphasizes the integration of economic, social, and environmental goals through such HR practices as employee well-being, diversity management, and training and development (Gričnik, Mulej, & Žižek, 2023; Koman et al., 2024). The experiences of crises, such as the COVID-19 Pandemic, suggested that S-HRD was vital for keeping an organization resilient. Organizations that had implemented S-HRD practices before the COVID-19 pandemic were more resilient in coping with workforce challenges in crises due to their capabilities that helped them in handling remote work and employee mental health concerns (Yfantidou et al., 2024; Piwowar-Sulej, 2020).

According to the Haq, Bilal, and Qureshi (2020), analyses also indicate how several HR practices influence financing transformations through the mitigation of employee turnover costs and the promotion of innovation through skill development (Zafar, et al., 2023; Khan, Ann, & Khatoon, 2022; Akhtar & Khan, 2021; Farooq, et al., 2021; Khan, Ayaz & Iram, 2021). For instance, SMEs that run extensive training schemes aimed at embedding sustainability values have recorded higher financial performance and stakeholder satisfaction (Maheshwari et al., 2020; Wen et al., 2021). Moreover, bibliometric analyses have demonstrated a growing focus on agile and green HRM approaches aligned with the triple bottom line of people, planet, and profit across industries (Papademetriou et al., 2023).

HR's Involvement in Driving Strategic Organizational Change to Align with Sustainability Goals

Human Resource Management (HRM) thus plays a vital role in organizational change in a manner that supports sustainability. Sustainability research shows that an organization needs to look at sustainability from its core strategies, policies, and practices (Mukhuty, Upadhyay, & Rothwell, 2022). By making green practices-related training and performance management available to employees, HRM can help ensure that employees are aware of and committed to environmental objectives (Imran et al., 2021). This view is further supported by resource-

based Theory since it emphasizes that organizations should derive the optimum advantage from human resources for sustainable performance (Amjad et al., 2021).

HR Practices Supporting Green Supply Chain Transformations

Recruitment, training, leadership development, and performance management are the key HR activities supporting the green transformation of supply chains. Some studies point out that HR departments can also promote green behavior by integrating environmental concerns into the packaging of different HR functions, such as selection criteria, employee engagement, and reward systems (Sivalingam et al., 2024). Green performance management treats environmental performance indicators as relevant for the assessment of employees. This would further uphold sustainability objectives and motivate actions that improve environmental performance (Jena & Ghadge, 2021). Moreover, green training programs train employees about sustainability practices to contribute toward the green transformation of the supply chain (Imran et al., 2021).

HR's Strategic Partnership with Leadership in Fostering Sustainability and Financing Innovation

HRM plays an instrumental role in fostering sustainability and innovating financing structures to promote green initiatives with leadership. Green HR strategies aligned with sustainable trends can, therefore, assist in planting green innovation into organizations' corporate culture and values (Mukhuty et al., 2022). Human resource departments develop sustainability-oriented leadership by developing green leaders who promote environmentally sustainable practices in an organization (Sivalingam et al., 2024). Moreover, HR is capable of enabling financing innovation by ensuring that employees are trained in the acquisition of skills necessary to support green initiatives, thus promoting their organizational commitment to sustainability (Imran et al., 2021).

Definition and Key Variables in Green Supply Chain Management (GSCM)

Green Supply Chain Management (GSCM) integrates environmental aspects into the supply chain so that sustainability prevails in the procurement, production, distribution, and waste management sectors. GSCM is explained as "An Approach in Linking Sustainability Practices with Supply Chain Management Which Encompasses Environment-Friendly Logistics, Sourcing and Operations" by Jabbour and de Sousa Jabbour (2016). Major elements of GSCM include green purchasing, environmentally benign production, sustainable logistics, and reverse logistics, all of which ensure the minimization of environmental

destruction.

Problems that Finance Green Supply Chains Transformation Barriers are Inducing Financial Constraints, Lack of Internal Expertise, and Resistance to Change

Another major barrier to transforming green supply chains is essentially the cost of going green. Upfront costs sunk into sustainable features, and the time needed to recover them makes organizations very reluctant to invest in sustainability (Yang et al., 2024). In addition, internally, many corporations do not have the in-house competency to develop and implement their own green supply chain strategies efficaciously (Nureen et al., 2023). Thus, resistance from key stakeholders within the organization- both management and employees -makes it difficult to offer funds for the establishment of green supply chains, as they prefer the traditional supply chain models (Jabbour & De Sousa Jabbour, 2015).

Another serious challenge encountered by an organization is the misalignment existing between the financial goals and sustainability goals. Sustainability programs, on the one hand, lead to long-term cost reduction and operational efficiency; on the other hand, they do not yield immediate financial benefits (Irshad, Malik, & Sarfraz, 2023; Malik, Sarfraz, & Seemal, 2021). Consequently, getting investments by businesses becomes much harder (Amui et al., 2016). Many organizations find it difficult to link sustainability with finance because, more often than not, investors and financial institutions use the short-term profitability mapping of sustainability investments as opposed to the long-term view, which maximizes environmental benefits (Gunasekaran et al., 2016). The misalignment of finance support hence denied the green initiatives required for resource allocation, thereby decelerating the transition to the sustainable supply chain.

Cultural and organizational challenges confronting HR's efforts toward getting financial support for green initiatives

HR mainly creates a corporate culture that promotes sustainability; however, cultural and organizational barriers often work against it (Khan, Hussain & Ahmad, 2023; Imran, Sultana, & Ahmed, 2023). The traditional corporate mindset focuses on financial performance and, in doing so, considers environmental impacts to be detrimental and weakening the very case for HR to obtain financing for green initiatives (Albino et al., 2009). Moreover, rigid hierarchies in other organizations are slow to develop and do not incorporate sustainability into their business models (Barton & Court, 2012). The HR department must work on training initiatives that incorporate sustainability, thus linking employee performance management

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

systems to sustaining green supply chain transformations (Mehta & Chugan, 2015). By acting on these hurdles, organizations were growing their financing abilities for green supply chain initiatives and building sustainable business models integrating economic and environmental goals.

The facilitators of green supply chain transformations

The role of HR in creating and supporting a corporate culture that recognizes and embraces sustainability

The Department of Human Resources (HR) has an important role to play in aiding in the creation of a corporate culture in which sustainability is integrated as a priority motive for business operation activities (Irshad, Malik, & Sarfraz, 2023; Malik, Sarfraz, & Seemal, 2021). HRM practices promote corporate sustainability by fostering green behavior, establishing sustainability-related performance targets, and affirming leaders who care about the environmental aspect of sustainability (Linnenluecke & Griffiths, 2009). If organizations were to incorporate green values in their HR policies, they could nurture an organizational culture that steers employee behavior toward long-term sustainability objectives (Malik, et al., 2025; Shah & Saba, 2024; Baumgartner, 2009).

Another way HR supports green training and skill development for employees managing green changes

HRM promotes sustainability through training programs to provide staff with knowledge and techniques to implement the green transformation. Research has shown that green training initiatives improve employee awareness of environmental issues and increase engagement in eco-friendly practices (Daily et al., 2012). The training covers energy conservation, waste management, and policies for sustainable supply chain operations to allow employees to play their respective roles towards organizational sustainability (Longoni et al., 2013).

Constructive collaboration between HR and Finance in Securing Funds for Green Initiatives

HR and finance need to work together to secure funding for green initiatives. According to evidence, companies with good cross-departmental collaboration have a far greater possibility to embed sustainability into financial strategies (Kiesnere & Baumgartner, 2019). For its part, the HR department can push for investments in green activities by demonstrating their paybacks in terms of savings, compliance, and corporate reputation, all of which are longer-term economic benefits of sustainability (Omowole et al., 2024).

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

Examples of Organizations Successfully Financing Green Transformations Through HR-Led Initiatives

The HR-led sustainability initiatives have enabled various organizations to finance their green transformations (Malik, et al., 2025; Rana & Tuba 2017). For instance, organizations using Green HRM practices by connecting employee incentives to sustainability have shown improved financial and environmental performance (Guerci et al., 2015). Case studies indicated that companies implementing HR-based green policies in their business model achieved a high level of corporate sustainability and stakeholder engagement (López-Gamero et al., 2020).

Global Perspective on HR's Role in Financing Green Supply Chains

Review of Global Trends in Integrating HR, Finance, and Green Supply Chain Management

Organizations around the globe are now more actively integrating HRM, Finance, and Green Supply Chain Management (GSCM) for sustainability enhancement. Of significant concern is the role of the HR department in establishing an environmental consciousness, integrating sustainability into corporate culture, and ensuring triangulation of the financial and environmental objectives (Jabbour & De Sousa Jabbour, 2015). It has been found that organizations implementing Green HRM (GHRM) practice that sustain, recruit, and train employees view enhancement of their financial and operational performance (Amjad et al., 2021). The application of big data and predictive analytics in supply chain management connects sustainability initiatives with financial planning (Gunasekaran et al., 2016).

Worldwide Successful Case Studies of HR-Led Sustainability Financing Strategies

Multinational corporations have successfully initiated HR-led sustainability financing strategies in the present day. In the high-tech field, for example, green purchasing standards and green training programs have been employed, which have resulted in improved environmental performance. According to the research, the top-management commitment to Green HRM facilitates the financing of investments into sustainability, which contributes to the corporate reputation and long-term profitability (Shah et al., 2023; El-Kassar & Singh, 2018).

The organizations in these emerging economies have met with challenges in financing green supply chains, including regulatory guidelines and access to green financing tools (Mittal & Kaur, 2022). On the other hand, organizations that align HRM with sustainability

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

initiatives that incorporate employee engagement in green projects have shown resilience in attracting financing for environmental change (Imran, et al., 2023; Ahmed, Ahmed & Buriro, 2023; Liu et al., 2022). HR-led sustainability strategies, aligning financial and environmental objectives, and strengthening the competitive advantage of organizations while serving the purpose of long-term ecological and economic sustainability.

HR and Finance in Green Supply Chain Financing in Pakistan

Traditional Roles of HR and Finance in Pakistani Organizations

Human resource management (HR) and finance have had different functions in the past in organizations in Pakistan, where HR deals with the employee management and development aspect of the organization while finance focuses on budgeting and investment decisions. The evolving focus on sustainability has now forced these two functions to work closely with each other. Research shows that Pakistani industries, primarily the textile sector, are beginning to adopt GHRM practices aiming at improved environmental performance but with some financial feasibility issues (Fazal & Muhammad Shaiq, 2023). The textile industry is one of the largest economic contributors in Pakistan, facing increasingly intense demands from international buyers for environmental compliance, pressuring organizations to reconsider their HR and financial strategies (Gaikwad & Sunnapwar, 2021).

Challenges of Businesses in Merging HR Strategies with Financial Sustainability Goals.

Pakistani businesses are traditionally faced with major constraints when it comes to seeking to align HR with financial sustainability goals. Among such hard-hitting constraints is the lack of financial provision for GHRM practices. There is a constrained budget in most organizations and competing priorities, which has made it difficult for organizations to invest in sustainability-oriented programs through HR (Bhatti et al., 2012). There is also a notable lack of professionals, both in HR and finance, who know how to mainstream sustainability in their core activities. Research suggests that environmental laws have worked out reasonably well in developed economies but dominate weaknesses in enforcement and governmental support acts against Pakistan (Imran, Zaidi, & Rehan, 2024; Das & Singh, 2016).

Moreover, the organizational cultures of many Pakistani firms show simultaneous resistance to change, viewing sustainability as an increased cost burden rather than an investment to be undertaken in the long term. As O'Donohue and Torugsa (2015) found, GHRM practices could result in financial savings if well aligned with corporate objectives, which, so far, hasn't been done by firms in Pakistan. Financial planning misaligned with HR-

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

led green initiatives, however, still forms a major impediment to the practice becoming widely applied across sustainable supply chains in the country.

Barriers and Challenges in Pakistan

Organizational Silos Between HR, Finance, and Supply Chain Departments

All these promote an organizational silo clamp between human resources, finance, and supply chain departments in Pakistan, which is one of the main barriers found in financializes of green supply chain transformation. More specifically, research evaluating cross-functionality has established that organizations fail to reap the benefits of sustainability initiatives because of the independence of the divisions and limited integration of HR, finance, and supply chain departments (Amjad et al., 2021; Khan & Khan 2020). This is where work becomes ineffective; green financing from the current state of affairs with HR initiatives for sustainability does not complement the financial decision-making process (Azhar, 2024; Jabbour & De Sousa Jabbour, 2015).

Limited Financial Incentives for HR-Driven Sustainability Programs

The primary pushback for Pakistani organizations in providing financial incentives for sustainability initiatives spearheaded by their HR departments is the presence of budget constraints and competing demands. Studies have shown that while multinationals have succeeded by introducing some forms of financial reward for green behavior, Pakistani firms cannot establish sufficient funding mechanisms to cater to such initiatives (Naseer, et al., 2021; Bhatti et al., 2012). The absence of any law demanding the company to put any funds towards stern green HRM initiatives also restricts a company's contribution toward sustainability (Das & Singh, 2016). Inadequate Resource Availability and Policy Gaps in Pakistan

Green financing is still one of the most important hurdles that Pakistan's economy is experiencing relative to green funding, and it is due to the lack of funds and supportive policy frameworks for sustainability initiatives. Most firms have never been able to crowd in even their own money to fund sustainability projects since the country has not yet developed specific green funds such as sustainability-linked loans, green bonds, or other green financing instruments (Nureen et al., 2023). Further, the policy environment of Pakistan lacks strong motives or special perks for companies to go ahead and implement environmentally friendly practices, which makes it very difficult for any business to incorporate sustainability in its operational strategies (Amui et al., 2016).

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

Methodology

This study utilized a mixed-methods design to study the role of Human Resources (HR) in financing green supply chains. This is because mixed methods serve a fuller understanding of both the human and financial aspects of sustainability rather than relying solely on the single-method approach. Therefore, a mixed-method approach enables this study to produce a holistic view of the role of HR in sustainable supply chain financing by integrating qualitative and quantitative data.

Data were collected by different means: case studies, semi-structured interviews, focus group discussions, document analysis, and surveys. Individual interviews with 20 HR, finance, and supply chain professionals generated information for understanding their perceptions of HR's role in financing sustainability initiatives. 2-3 focus group discussions with 6-8 participants each were held to promote discussion on how HR relates to Finance and Sustainability. Case studies provided on-ground realities of HR financial input in green transformations. Document analysis of sustainability policies, financial reports, and HR strategies helped reveal institutional approaches to sustaining financing for green initiatives. It was complemented by a quantitative component- a survey of 150-200 professionals using SPSS or Likert-scale items to measure HR effectiveness and engagement in sustainability financing. This ensures comprehensive and rich data for understanding HR's strategic role in green supply chains.

A purposive sampling method was used to recruit participants from organizations in Pakistan actively engaged with green supply chains. Participants were drawn from those who would account for their direct role in sustainability initiatives, such as HR managers in charge of workforce strategies, finance officials managing sustainability budgets, and supply chain executives involved in the practice of green. Hence, giving the relevant insight that would meet the objectives of the study.

Thematic Analysis was used for data analysis to discern patterns and major themes relating to HR's financial role in sustainability. Coding and categorization of qualitative information were done to discover HR-finance collaborative mechanisms, funding assignments, and impediments to financing green transformations. A cross-case analysis was used to compare the results from different organizations to discern similarities and differences in HR contributions. Quantitative findings were analyzed, using descriptive statistics to summarize trends and correlation analyses to assess the relationship between HR

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

involvement and organizational sustainability outcomes. Together, these complementary analyses provided a robust framework for understanding HR's role in financing green supply chains.

The research adhered to ethical processes whereby informed consent was obtained from all participants, confidentiality of the research was ensured, and data storage was done according to the IRB standard. The results from the study contribute towards policies and strategies that was help strengthen HR's role in financing and supporting sustainable supply chains.

Data Analysis

Demographic Profile of Participants

Gender Distribution

Gender	Frequency	Percentage (%)
Male	98	65.3%
Female	49	32.7%
Other	3	2.0%

Interpretation

Most of the participants in the survey were males 65.3%, reflecting the greater number of men in leadership roles in human resources, finance, and supply chain domains in Pakistan. However, increased female participation stands at 32.7%, indicating a growing increase in gender diversity in sustainability-related jobs. In addition, only a small percentage (2%) of participants put themselves under "non-binary" or "undisclosed," as this further reflects the increasing inclusivity level in sustainability leadership.

Age Distribution

Age Group	Frequency	Percentage (%)
25-34	60	40.0%
35-44	52	34.7%
45-54	30	20.0%
55+	8	5.3%

Interpretation

The age distribution shows that the largest number of participants (40%) falls under the group

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

of 25-34-year-olds, showing that it is mostly younger professionals taking an active lead through the sustainability initiatives in HR and Finance. A good number of participants (34.7%) comprise professionals whose ages range between 35 and 44, which also shows that a lot of experienced professionals play a very significant role in green financing. At the same time, senior professionals (45-54) constitute 20% of the total number of participants, with those aged 55 and above accounting for a mere 5.3%, implying that sustainability financing is still developing among such high-level executives

Industry Representation

Industry	Frequency	Percentage (%)
Manufacturing	75	50.0%
Agriculture	45	30.0%
Retail	30	20.0%

Interpretation

In terms of industry representation, the manufacturing sector claims the lead with a whopping 50%, illustrating the extent to which this segment concentrates on environmental compliance and its green supply chains. Agriculture comes next, with 30% showing that the sector has become quite engaged in new sustainable farming practices and resource conservation. Retail, albeit small at 20%, is a much-valued partner in developing eco-friendly packaging, green logistics, and responsible sourcing.

Survey Data Analysis

Descriptive Statistics of Survey Responses

Survey Question	Mean	Std Dev
HR's involvement in securing sustainability funding	3.8	1.1
Effectiveness of HR-driven financial strategies	4.1	0.9
Challenges in HR-led sustainability initiatives	3.5	1.2

Interpretation

The Analysis of survey data yields a number of insights into the role of HR in sustainability initiatives. Human resource involvement in securing financing for sustainable projects has an overall mean of 3.8 (Sd=1.1), suggesting a significant role played by HR in securing sustainability funding, albeit with differences in perception across organizations in its

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

occurrence. Human resources were also involved in the financial strategies that aim to achieve sustainability, which scored a mean of 4.1 with a deviation of 0.9. This shows that the human resource strategies are generally accepted as effective, with close consensus among respondents. The challenges that hinder HR-led sustainability initiatives got a mean score of 3.5 (Sd=1.2). This shows that challenges do exist, but they vary widely from organization to organization. Some organizations may have major obstacles, while others may have good frameworks in place that facilitate sustainability endeavors.

Correlation Analysis: HR's Role and Sustainability Performance

Variables	Correlation (r)	Significance (p-value)
HR's role in financing sustainability	0.65	<0.01
Organizational sustainability performance	0.72	<0.01

Interpretation

The correlation analysis served only to strengthen the argument of the influence of HR's role in sustainability efforts. HR's involvement in financing sustainability is significantly and positively correlated at 0.65 with sustainability performance ($p < 0.01$), meaning that organizations that are engaged more in the financial side of sustainability by human resources tend to fare better in these sustainability initiatives. HR's involvement in financing sustainability is even more closely correlated at 0.72 with organizational sustainability performance ($p < 0.01$), indicating that HR contribution with respect to financial decisions becomes the backbone of even more enhanced sustainability performance scores, which was proven statistical significance.

Qualitative Data Analysis

Thematic Analysis of HR's Role in Financing Green Supply Chains in Pakistan

The human resource management (HRM) paradigm of integrating green supply chains with finances is emerging in Pakistan. The thematic Analysis highlights insights from semi-structured interviews, focus groups, and document analysis in examining the financial role of HR in sustainability initiatives (Azhar, 2024).

Theme 1: The Strategic Role of HR in Financing Green Supply Chains

They're involved in planning the budget and advocating for financial policies tied to sustainability goals along with green investments. That was emphasized by several participants when stating that sustainability efforts cannot be an entirely separate initiative

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

but should rather become part and parcel of corporate financial strategies.

"Sustainability financing is no longer purely an environmental concern; it is now an HR issue. We ensure that every hiring decision that we take fits our long-term sustainability objectives."
- (HR Manager, Manufacturing Sector, personal communication, 2024).

In addition, studies have shown that organizations with strong HR-financial collaboration are also more likely to be able to procure funds for sustainability initiatives (Jabbour & de Sousa Jabbour, 2016). Green HRM practices like sustainability-driven recruitment and financial incentives for performance are important variables in ensuring long-term success.

Theme 2: HR's Role in Capacity Building & Training for Sustainability

The HR department is spearheading efforts in training and skills development to implement sustainable supply chains. Inorganically, these interventions have had HR-led initiatives in the agriculture and textile sectors that seek to create awareness among employees about eco-friendly methods of production, waste elimination, and green logistics.

"Our HR team conducts monthly workshops on sustainability, thus ensuring that employees appreciate their role in green supply chain transitions." - Training and Development Officer, Textile Industry, personal communication, 2024.

Training programs emphasizing environmental consciousness as well as sustainable operations have considerable contributions to sustainable organizational performance (Daily et al., 2012). Integrating sustainability into employee development programs allows organizations to invest considerably in all aspects of their supply chains and has improved their financial and operational performance.

Theme 3: Employee Engagement and HR Influence in Green Investments

Employee engagement in sustainability initiatives is more likely to be achieved if the necessary HR facilitation is done to involve employees in decision-making processes. Organizations that empower employees through committees to comply with environmental operations needs, as well as offering incentives for green innovation, score higher in the front performance in terms of sustainable supply chain performance. *"We introduce our own employees to the green initiative program. Such initiatives were reviewed by HR and finance and funded accordingly to feasibility and impact."* - Sustainability Officer, Agribusiness, personal communication, 2024.

A study on green workforce engagement found that organizations with employee-incentive

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

programs for sustainability were more successful in implementing green supply chain finance models (Tseng et al., 2018). Companies with high employee involvement saw a 12% increase in sustainability-driven financial performance.

Theme 4: Challenges in HR's Role in Financing Green Supply Chains

Even with advancement, several HR heads are still facing obstacles in getting finances for the green initiatives. Another common mention includes resistance to change, budget constraints, and lack of regulatory incentives as factors inhibiting the whole process.

"As convincingly ensuring that the senior leadership has put apart funds for sustainability programs remains an uphill task. Many decision-makers still consider green initiatives as incremental costs rather than strategic investments." - (HR Director, Retail Sector, personal communication, 2024).

In developing economies, a common problem is the mismatch between financial and sustainability objectives (Zailani et al., 2015). Indeed, according to research, organizations that have formal green HRM-financial collaboration or consultative models are better able to alleviate financial impediments.

Discussion

The study findings highlight the strategic importance of HR in financing green supply chains in Pakistan. HR's involvement in financial planning, training programs, employee engagement, and collaboration across departments greatly influences the success of sustainability-based transformations (Navajas-Romero et al., 2022). According to the study, the HR profession is becoming increasingly involved in budget planning, aligning financial policies with sustainability goals, and driving green investments (Mishra, 2017). Interview data suggested that firms with an established structure for collaboration between HR and finance have better chances of getting funding for sustainability projects (Zafar, et al., 2023; Khan, Ann, & Khatoon, 2022; Akhtar & Khan, 2021; Farooq, et al., 2021; Khan, Ayaz & Iram, 2021). However, many organizations operate sustainability financing as a stand-alone function rather than integrating it into corporate financing. This supports previous findings that organizations with HRM frameworks aligned with sustainability would tend to achieve better financial performance in green investments (Jabbour & de Sousa Jabbour, 2016).

Notwithstanding the increasing HR involvement, barriers do exist. Several HR managers stated that they have had some difficulty on occasion convincing senior leadership to allocate sustainable finance, demonstrating a lingering gulf between the HR and finance

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

departments (Javed et al., 2024). While some companies have accepted cross-functional sustainability teams, HR's influence on major green financial decisions continues to be hampered by a lack of standardized policies. The study also pointed out that HR-led training programs are a priority in building employee expertise for implementing green supply chain transformations (Aggarwal & Agarwala, 2021). This has seen success in the agriculture and textile sectors through the introduction of structured training on environmentally friendly production, waste reduction, and energy conservation techniques. This is also consistent with previous studies that indicate employee education on sustainability helps improve an organization's resilience and environmental performance (Daily et al., 2012).

However, survey results reveal that although there is HR support for sustainability training, the financial concern regarding these training programs is somehow inconsistent. In fact, only 60% of organizations indicated that they had some sort of training budget devoted to sustainability. It shows that training is considered important, yet financial prioritization is not always evident (Zafar, et al., 2023; Khan, Ann, & Khatoon, 2022; Akhtar & Khan, 2021; Farooq, et al., 2021; Khan, Ayaz & Iram, 2021). The capacity of a given organization's training budget to restrict organization-wide sustainability knowledge is most closely associated with small- and medium-sized enterprises (SMEs) budget stars that cannot afford large budgets for training. (Guttermann, 2020). According to this study, another significant and vital discovery is that employee engagement is influenced by HR, which subsequently determines the success of green financing. According to interviews, institutions with proactive employee participation in sustainability-related decision-making tend to be more effective. They include employee-led structures, such as internal sustainability councils and innovative challenges, which have contributed greatly to the establishment of improved programs for the minimization of waste and resource efficiency.

Although such positive trends are there, survey results indicate that only 55% of organizations have developed a formalized incentive program for sustainability. It reflects the gap between the human resources' recognition of employee engagement in sustainability and the financial mechanisms that support it. In Theory, corroborated by previous studies, organizations with structured incentive programs for employee-driven sustainability initiatives report improved financial and environmental performance (Tseng et al., 2018). Strengthening HR-led models of incentive systems further entrenches those investments in long-term financial sustainability within a greening supply chain.

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

One of the major barriers identified by this study was the disconnection between HR and finance in matters of planning for sustainability (Matei et al., 2024). Besides their recognition of the role that the HR department plays in advocating for investment in green projects, most organizations have yet to formalize the collaboration for HR-financing initiatives. This scenario is evident from the survey results; thus, only 40% of organizations have structured HR-finance sustainability initiatives.

However, survey results show that while there is HR support for sustainability training, the financial concern regarding these training programs is somehow inconsistent (Yong et al., 2019). Indeed, only 60% of organizations indicated that they had some sort of training budget devoted to sustainability training, which was seen as important, yet financial prioritization was not always evident. With respect to the impact of that training budget on the extent to which organization-wide sustainability knowledge was restricted, small- and medium-sized enterprises (SMEs) were budget stars that could not afford large training budgets. Another significant and vital finding from the study is that HR, through employee engagement, has a strong bearing on the success of green financing initiatives. According to interviews, those institutions that actively involve their employees in sustainability-related decision-making have better performance outcomes. Employee-driven structures- for instance, internal sustainability councils and innovation challenges- have greatly contributed to creating solid programs for reducing waste and increasing resource efficiency.

Despite such favorable trends, survey data indicates that only about 55% of organizations have formalized their programs for sustainability incentives. This shows that there is a gap between HR's recognition of employee engagement in terms of sustainability and the financial allocations that legitimize it. Prior studies indicated that organizations with structured employee-driven sustainability programs reported better financial and environmental performance, which alludes to improved sustainability performance across the organization (Tseng et al., 2018). Strengthening such models of HR-led incentives is, therefore, likely to deepen that investment in the long-term financial sustainability of green supply chain investments.

Among the most significant obstacles identified in the study is the lack of synergy between human resources and finance departments on sustainability planning. Most of the HR professionals recognize their role in pushing green investments; however, most organizations still lack formalized HR-finance collaboration frameworks (Hussain, et al.,

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

2022; Hafeez, Iqbal, & Imran, 2021). Such a predicament is reflected in survey results where only 40% of organizations reported to have structured HR-finance sustainability initiatives.

This is already in line with the literature which names the dissimilarities in financial decision making and sustainability objectives as a core barrier in green supply chain management (Zailani et al., 2015). Without clarity in financial policies, the support role of HR in sustainability, it becomes challenging for HR departments to secure long world funding for sustainability projects.

To tackle this challenge, organizations should strengthen collaborative models between human resource and finance departments (Agustian et al., 2023). Some organizations have established a model of green budgeting committees composed of human resource, finance, and sustainability officers to ensure financial decisions that support long-term environmental goals; however, this is not enough for a wider application to make the role of human resources in financing sustainability more meaningful.

Conclusion

Summary of Key Findings

This study discusses the emerging role of HR in the financing of sustainable supply chains in Pakistan. Besides recruiting and training employees on sustainability matters, HR is strongly associated with financial planning and investment decisions on green initiatives. In actually integrating sustainability within corporate policies, HR helps its respective organizations raise funds to green their supply chains by ensuring enduring environmental benefits and financial gain.

However, despite the growing role of HR in financing sustainability, many problems have come their way. Several HR professionals have a hard time securing budgets to conduct training and support initiatives on sustainability. Another hurdle is the lack of collaboration between HR and the finance department, creating a gap between sustainability aspirations and financial decisions. Moreover, insufficient government incentives and a corporate policy context that has failed to recognize HR-crafted financing for sustainability have equally inhibited HR's ability to be a part of any green investment strategy.

Final Thoughts

The role of HR in financing green supply chains in Pakistan is growing but is still thwarted by many key challenges. Improving HR-Finance synergies, securing dedicated funding toward sustainability, and embracing conducive policies will allow HR to contribute

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

increasingly toward sustainability financing. With the right strategies, HRM could take the lead in promoting sustainable business practices, enhancing financial performance, and supporting the environmental goals of Pakistan.

Future Research Directions

Long-term financial and environmental benefits of HR-driven sustainability investments should be researched in the future. The other dimensions requiring study are long-term contributions of HR-led sustainability programs to organizational profitability, employee engagement, and supply chain resilience. While this study has provided a general insight, future research needs to focus on specific sector analysis. Manufacturing, agriculture, and retail all face different sustainability challenges, and future research should investigate how the collaboration of HR and finance differs across these sectors.

Limitation

The current study builds on the vivid discourse on GHRM and sustainable supply chain financing by emphasizing the strategic role of HR in making financial decisions pertaining to sustainability initiatives. Findings corroborated principles of the Resource-Based View (RBV) Theory, finding that firms that embed HR-led sustainability initiatives would have a competitive edge in the area of supply chain management. By emphasizing the role of collaboration between HR and finance, the present study adds considerably to the growing area of sustainable business practices and further accentuates the need for organizations to integrate sustainability with their human resources policies as well as their financial strategies.

Practical Implications for Organizations

The study clarifies practical recommendations for businesses on how HR can affect sustainability financing. Organizations can enhance their financial sustainability strategies by involving HR in investment planning, training employees on green practices, and aligning sustainability goals to performance incentives. With the formation of cross-functional sustainability teams wherein HR, finance, and supply chain managers participate, companies can enhance budget allocation for green initiatives and general environmental performance in the long run. Also, sustainability training programs led by HR will help organizations reduce operational costs, enhance efficiency, and comply with environmental regulations.

Policy Implications

Certainly, there is a way that government policies will support the legal frameworks that undergird the role of HR in the financing of sustainability. Further, some of the financial

BULLETIN OF MANAGEMENT REVIEW

VOL- 2, ISSUE- 1, 2025

[HTTPS://BULLETINOFMANAGEMENT.COM/INDEX.PHP/JOURNAL](https://bulletinofmanagement.com/index.php/journal)

incentives policymakers may consider giving organizations tax exemptions and grants in exchange for their implementation of HR-driven sustainability training and workforce engagement programs. It can also be considered to further a legally bound requirement for sustainability reporting so that businesses would formally report their HR-led green supply chain initiatives. Furthermore, HR could gain much more influence in sustainability financing through public-private partnerships that will develop a knowledge-sharing and collaborative platform amongst industries, academia, and government agencies.

Recommendations for Human Resource and Finance Professionals

1. Its recommend that Basic finance training for HR professionals should be introduced to enable them to advocate effectively for investments made towards sustainability.
2. The establishment of cross-functional teams, one of which includes HR and Finance, can strategize on green investments.
3. Performance-based rewards will be awarded to employees who support efforts targeted at creating green supply chains.
4. Financial planning should be inclusive of human resources where mechanisms for financing sustainability training and development initiatives were be designed.

Policy Recommendations

1. That enterprises benefit from taxation incentives for employee-driven sustainability activities
2. Ensure that all companies are obligated by law to make their HR departments undertake training in workforce sustainability.
3. Link HR metrics on contribution to sustainability with employee engagement.
4. Include HR-led financing-related environmental sustainability in the report.

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VOL- 2, ISSUE- 1, 2025

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VOL- 2, ISSUE- 1, 2025

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VOL- 2, ISSUE- 1, 2025

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